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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/813,943	03/30/2004	Yang Woon Na	CL-10274	5779

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EXAMINER	
CANNING, ANTHONY J	
ART UNIT	PAPER NUMBER
2879	

DATE MAILED: 11/09/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	10/813,943	NA ET AL.
	Examiner	Art Unit
	Anthony J. Canning	2879

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 March 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-15* is/are pending in the application.

4a) Of the above claim(s) *14* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-13 and 15* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *30 March 2004* is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *2 sheets*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:

   I. Claims 1-13 and 15, drawn to an emitter composition, classified in class 313, subclass 495.

   II. Claim 14, drawn to the method of manufacturing of an emitter composition, classified in class 445, subclass 51.

The inventions are distinct, each from the other because of the following reasons:

2. Inventions II and I are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make other and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case the emitter composition can be manufactured by a materially different process, such as using a vibrating table to mix the composition.

3. Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

4. During a telephone conversation with Cathy on 1 November 2005 a provisional election was made with traverse to prosecute the invention of Group I, claims 1-13 and 15. Affirmation of this election must be made by applicant in replying to this Office action. Claim 14 is

withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

5. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which the subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

7. Claims 1-12 and 15 rejected under 35 U.S.C. 103(a) as being unpatentable over Amey et al. (U.S. 6,409567 B1) in view of Chuang et al. (U.S. 6,359,383 B1).

8. Regarding claim 1, Amey et al. disclose an emitter composition of a field emission cell (column 3, lines 8-9), including a carbon emitter (column 10, lines 8-19), a binder (column 6, lines 66-67; column 7, lines 1 and 6-8; the organic medium is a resin, which is a binder), glass frit (column 6, lines 66-67), a dispersing agent (column 6, lines 66-67; column 7, lines 1-5), and an organic solvent (column 7, lines 1 and 8-10). Amey et al. fail to disclose that the field emission cell further includes carbon nanotubes and 0.1-20 wt % of diamond, based on a weight thereof.

Chuang et al. disclose a field emission cell including carbon nanotubes and 0.1-20 wt% diamond (column 6, lines 27-45; column 5, lines 3-6; the carbon nanotubes include diamond). Carbon nanotubes and diamond are ideal electron emitters due to their electronic properties, ionization energy, and small size.

Therefore, it would have been obvious to one having ordinary skill in the art, at the time the invention was made, to modify the field emission cell of Amey et al. to include carbon nanotubes and 0.1-20% diamond, as taught by Chuang et al., for electron emitters with electronic properties, ionization energy and size that makes them ideal for use in field emission cells.

9. Regarding claim 2, Amey et al. and Chuang et al. disclose the emitter composition as defined in claim 1. Amey et al. discloses the claimed invention except for carbon nanotubes are used in an amount of 2-20 wt %, based on the weight of the composition. It would have been obvious to one having ordinary skill in the art at the time the invention was made to use carbon nanotubes are used in an amount of 2-20 wt %, since it has been held that where the general

conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

Chuang et al. further disclose that the carbon nanotube is used in an amount of 2-20 wt %, based on the weight of the composition (column 5, lines 3-6). Carbon nanotubes are ideal electron emitters due to their electronic properties, ionization energy, and small size.

Therefore, it would have been obvious to one having ordinary skill in the art, at the time the invention was made, to modify the field emission cell of Amey et al. to include carbon nanotubes in an amount of 2-20 wt %, as taught by Chuang et al., for electron emitters with electronic properties, ionization energy and size that makes them ideal for use in field emission cells.

10. Regarding claim 3, Amey et al. and Chuang et al. disclose the emitter composition as defined in claim 1. Amey et al. disclose the claimed invention except that the binder is used in the amount of 40-70 wt%. It would have been obvious to one having ordinary skill in the art at the time the invention was made so that the binder is used in the amount of 40-70 wt%, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

Chuang et al. further disclose that the binder is used in the amount of 40-70 wt%, based on the weight of the composition (column 5, lines 3-6, the binder portion is 20 wt% to 80 wt%). Binders are used to hold the electron emitters in place.

Therefore, it would have been obvious to one having ordinary skill in the art, at the time the invention was made, to modify the field emission cell of Amey et al. to include that the

binder is used in the amount of 40-70 wt%, based on the weight of the composition, as taught by Chuang et al., for the added benefit of securing the electron emitters in place

11. Regarding claim 4, Amey et al. and Chuang et al. disclose the emitter composition as defined in claim 1. Amey et al. disclose the claimed invention except that the glass frit is used in the amount of 2-20 wt %, based on the weight of the composition. It would have been obvious to one having ordinary skill in the art at the time the invention was made to that the glass frit is used in the amount of 2-20 wt %, based on the weight of the composition, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

Amey et al. further disclose that the glass frit is used in the amount of 2-20 wt %, based on the weight of the composition (column 7, lines 24-31; the solid particles are 40 wt% to 60 wt% of the paste, which includes glass frit and other materials, the amount of glass frit can fall in the range of 2-20 wt% by the percents given in column 7).

12. Regarding claim 5, Amey et al. and Chuang et al. disclose the emitter composition as defined in claim 1. Amey et al. disclose the claimed invention except that the dispersing agent is used in the amount of 1-5 wt %. It would have been obvious to one having ordinary skill in the art at the time the invention was made to that the dispersing agent is used in the amount of 1-5 wt %, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

Amey et al. further discloses that the dispersing agent is used in the amount of 1-5 wt %, based on the weight of the composition (column 7, lines 24-31; the solid particles are 40 wt% to

60 wt% of the paste, which includes the dispersing agent and other materials, the amount of dispersing agent can fall in the range of 1-5 wt% by the percents given in column 7).

13. Regarding claim 6, Amey et al. and Chuang et al. disclose the emitter composition as defined in claim 1. Amey et al. disclose the claimed invention except for that the organic solvent is used in the amount of 1-5 wt %. It would have been obvious to one having ordinary skill in the art at the time the invention was made to that the organic solvent is used in the amount of 1-5 wt %, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

Amey et al. further disclose that the organic solvent is used in the amount of 1-5 wt %, based on the weight of the composition (column 7, lines 24-31; the solid particles are 40 wt% to 60 wt% of the paste, which includes the organic solvent and other materials, the amount of organic solvent can fall in the range of 1-5 wt% by the percents given in column 7).

14. Regarding claims 7-12, Amey et al. and Chuang et al. disclose the emitter composition of claims 1-6. Amey et al. further disclose that the organic solvent is selected from the group consisting of terpineol, butyl carbitol acetate, butyl carbitol, and mixtures thereof (column 7, lines 8-10).

15. Regarding claim 15, Amey et al. and Chuang et al. disclose a field emission cell, including an emitter composition manufactured by the method of claim 9 and then printed to be a thick film. This is a product-by-process limitation and is not given patentable weight. A comparison of the recited process with the prior art processes does Not serve to resolve the issue concerning patentability of the product. *In re Fessman*, 489 F2d 742, 180 USPQ 324 (CCPA

1974). Whether a product is patentable depends on whether it is known in the art or it is obvious, and is not governed by whether the process by which it is made is patentable. *In re Klug*, 333 F2d 905, 142 USPQ 161 (CCPA 1964). In an ex parte case, product-by-process claims are not construed as being limited to the product formed by the specific process recited. *In re Hirao et al.*, 535 F2d 67, 190 USPQ 15, see footnote 3 (CCPA 1976).

16. Claim 13 rejected under 35 U.S.C. 103(a) as being unpatentable over Amey et al. (U.S. 6,409,567 B1) in view of Chuang et al. (U.S. 6,359,383 B1) and in further view of Eom et al. (U.S. 5,747,918).

17. Regarding claim 13, Amey et al. and Chuang et al. disclose the emitter composition as defined in claim 1. Amey et al. disclose the claimed invention except for that the diamond includes powders each having a size not larger than 6 μm. It would have been obvious to one having ordinary skill in the art at the time the invention was made to that the diamond includes powders each having a size not larger than 6 μm, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

Eom et al. disclose an emitter composition including diamond powder each having a size not larger than 6 μm (column 8, Example 4). Diamond powders make good electron emitters do to their electrical properties and ionization energy.

Therefore, it would have been obvious to one having ordinary skill in the art, at the time the invention was made, to modify the electron emitter composition of Amery et al. to include

that the diamond includes powders each having a size not larger than 6 μm, as taught by Eom et al., the electronic properties and ionization energy of diamond powders make them good electron emitters.

Contact Information

18. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anthony J. Canning whose telephone number is (571)-272-2486. The examiner can normally be reached on M-F 8:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nimesh D. Patel can be reached on (571)-272-2457. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Anthony Canning AC
4 November 2005

ASHOK PATEL
PRIMARY EXAMINER